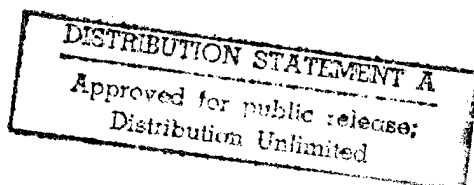


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East Europe Report

SCIENCE & TECHNOLOGY

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26 July 1984

EAST EUROPE REPORT

SCIENCE & TECHNOLOGY

CONTENTS

BULGARIA

- Broad Use of Terminals in Accounting Anticipated
(Rositsa Aykova; SCHETOVOGSTVO I KONTROL, No 4, 1984) 1

GERMAN DEMOCRATIC REPUBLIC

- Trends in Microprocessor Technology Outlined
(M. Pardon; MILITAERTECHNIK, No 3, 1984) 10

Briefs

- Laser Use in Nuclear Fusion 15
GDR-USSR Nuclear Fusion Cooperation 15
Semiconductor Research Cooperation Described 15
Circuit Board Etching Device 16
Home Computer HC 900 Developed 16
Freely Programmable Grinding Machine 16
New Anticorrosive Product Developed 17
New Program Control Unit 17
Molecular Compound Research Reported 17

HUNGARY

- Academician Explains, Stresses Importance of Biotechnology
(Istvan Lang; PARTELET, No 6, Jun 84) 18

Briefs

- Nuclear Research Institute Cyclotron 21
Microcomputer Controls Entire Technology 21
Tool Designing Computer System 21
Monitoring, Disposal of Radioactive Waste 22

POLAND

New Computer Developments Described (GLOS WYBRZEZA, 18 May 84; PRZEGLAD TECHNICZNY, No 23, 3 Jun 84)	23
Elwro-523 Minicomputer Production Establishment of Interschool Computer Network	
Development of Microelectronics Described (ELEKTRONIKA, No 2, Feb 84)	31
Decline of Computer Industry Assessed (Krzysztof Fronczak; ZYCIE GOSPODARCZE, No 19, 6 May 84).	39

ROMANIA

Research on Crop Protection, Pesticides (Al Alexandri; PRODUCTIA VEGETALA, May 84)	44
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BULGARIA

BROAD USE OF TERMINALS IN ACCOUNTING ANTICIPATED

Sofia SCHETOVOdstvo I KONTROL in Bulgarian No 4, 1984 pp 38-46

[Article by Associate Professor Rositsa Aykova, candidate of economic sciences: "Using Terminals for Processing Accounting Information"]

[Text] Under the conditions of contemporary socioeconomic and scientific-technical progress, the question of improving the economy's control system is felt acutely. This necessity is imposed by the discrepancy between the level of production and the methods of managing national economic sites. The close relationship between the necessity of improving management and seeking ways to obtain effective processing of the information used in this process derives from the nature of information in the management process. Because of this, one of the most important and complex questions of the whole complex of problems related to improving management is the question of automated data processing. Its effective resolution is connected to the maximum use of hardware for gathering, transmitting, and processing information.

At the present stage, accounting reports are the main source of information management. In order to comply with the requirements for improving management, there should be a sufficient amount of operative, analytical, reliable information which would make it possible to manage economic activity. These requirements could be observed by applying qualitatively new technology for data processing by using computer technology.

The development of scientific-technical progress has allowed the automated processing of accounting information now by using contemporary computers, as well as different types of hardware for transmitting information. Terminals, which are highly effective for transmitting information, have great importance for processing accounting information. They provide a direct link between the users of information, the place where the information originated, and the computer. The necessity for applying them derives from the fact that using computers alone permits automation solely of those operations related to the processing and storage of data. The labor cost for these operations is about 50 percent of the total cost for the entire information process. This is why more and more

attention is being paid to the automation of the other elements of this process, and, more precisely, to the transfer of information, because the delay in processing accounting information reflects negatively on decision-making by management.

Among the great number of problems which arise during the application of terminals, attention in the present article will be devoted to the necessity and preconditions for their use in processing accounting information; the time usage of terminals will be analyzed and an attempt will be made to outline the prospects for developing their use in this direction.

The study of experience with using computers for processing accounting information in our country, under conditions when automated control systems (ACS) were being built, shows that the Management of Financial Activity subsystem is comparatively widely used. Its relative share is 20.8 percent of the total of ACS subsystems implemented. Taking into consideration the fact that processing accounting information represents a significant part of the developments implemented related to labor and wages, the management of material and technical supplies, and management of realized production, which represents 48 percent of the subsystems implemented, one could have a clear idea about the automated processing of accounting information in the ACS's. In addition to that, one must add the processing of information at separate enterprises and organizations with micro- and minicomputers, including tasks mostly related to accounting reports. The main reasons for the rapid implementation of computer technology for processing accounting information are based on the degree of labor consumption for its processing, which explains the great number of accountants, the great volume of arithmetic and logical operations, and the regularity of obtaining initial and operative information.

The application of terminals in processing accounting information results mostly from the necessity of supplying accounting and analytical information within a required schedule so that regulating measures can be developed. The application of economic methods of management requires that a great amount of work related to accounting and analysis be done so that a number of indices may be brought to the subdivisions of the site managed, to assure their regulation during the course of production. The complete application of self-accounting and internal self-accounting requires that a reliable system of rapid collection, transmitting, and processing of information be provided. Experience over the course of the last few years shows that it is difficult to provide regulating information, even in the case of applying self-accounting only at the top levels of management, because accounting information proceeds from the computer to the management organ after the economic processes have already been completed and their condition is registered only at a specified moment.

Self-accounting, as a system for planned economic organization of the production process, requires an increase in the range of indices used in the process of management. Having, within the required schedule, the exact determination of assets and liabilities from the activity of separate

sites and income realized is of great importance here. In addition to the possibility of accounting for the results of the self-accounting application, it is necessary to determine the factors for formulating them, that is, the indices which condition to a certain extent the effective flow of economic activity.

In order to implement internal self-accounting at each workshop, in each brigade, it is necessary to have a reliable system for links with the computer, which are provided via the terminals. Their application will flow for the possibility of timely accounting, analysis of the economic process, and the regulation of decisionmaking.

The necessary preconditions for the successful application of terminals in processing accounting information are presently available. Although conditional to a certain extent, these preconditions could be separated into two basic groups -- organizational/economic and software/hardware.

The group of organizational and economic preconditions should include those preconditions which result from the existing organizational and management structure of the economy, the management system in our country, from the requirements related to applying new methods of management, and from the increased possibilities of supplying a broad range of hardware for carrying out information processing and the rational use of the computer.

The establishment of adequate organizational and management structures at the present stage of development in our socialist economy raises the problem of timely gathering and remote control transmitting of accounting information with particular acuteness. By improving management and moving on to a two-link system, the role of individual enterprises, combines whose subdivisions are separate from the place of computer information processing (by 20-30 kilometers, for example, in agriculture), have increased sharply. The necessity for having a link between the places where information originates and the computer, as well as a link with managerial organs at the top levels of management, which in this case is the user of the information, should be considered a reason and a precondition for using terminals in the information process.

The use of contemporary methods of management, such as economic-mathematical, will increase the efficiency of the economy. Science had developed a sufficient number of optimization models for the separate branches, but they have limited application, mainly because of the lack of standard basis and information bonding between the models themselves, as well as the data base. The use of economic-mathematical methods requires that the information which characterizes the course of the production process be input through terminals and added to the standard reference data stored in the machine. All subsequent processing operations related to using the appropriate economic-mathematical model should be executed without additional data input.

The economic preconditions for using terminals in processing accounting information should be examined from two points of view. On the one hand, there are quite a few computers operating in our country, and in order to

use them at maximum capacity, they should be used on a collective basis (especially the powerful computers). This is impossible without the availability of terminals for establishing links between the separate sites and the computer. On the other hand, the economic capabilities of individual enterprises, organizations, administrations, and of the country as a whole for expanding the material and technical basis, including management, makes it possible to supply terminals for creating conditions for dialogue with the computer, which will make it possible to improve the quality and effectiveness of management.

The group of software/hardware preconditions is related to increasing the possibilities of computers by sharply increasing the capacity of their external memory, to the possibility of differentiating on-line input-output operations, production of different types of terminals and developing communication software for human links, to implementing micro-and mini-computers, to developing means of telecommunication and creating operating systems.

Without going into further detail with respect to the above-mentioned preconditions, it is necessary to point out that during the next few years, machines of the SM-4, IZOT 1003S, and ES-9005 types will be applied widely in our country for local processing of accounting information, as well as for building networks of computers and terminals. For instance, 34 terminals can be connected to the Bulgarian-made SM-4; these machines can also be connected to large computers (such as the ES-1035, the ES-1055, and others, for example). The production of terminals has increased sharply at a number of administrations in our country, although there are terminal networks operating on a partial basis. On-line information transmitting networks are being used at the Committee for an Integrated Social Information System, the Bulgarian National Bank, Balkan Bulgarian Civil Aviation, for the system of material and technical supply, and others. They are all using a sizable number of terminals, and information is transmitted through communication channels at a comparatively high speed (1200 bits/sec). The ES, EIM, and ESTEL-2 are the main parts of the networks constructed at some of the administrations here, and the expanded implementation of the ESTEL-4 is at hand.

When analyzing how terminals are used in our country, it is necessary to pay attention to the loading of the terminals and to the channels. At the same time, this depends a lot on the method used for inputting information, on the speed of the input and output devices, and on the speed of the communication channels' operations. This time is not equal to the time of using the computer because the time the machine needs for processing information at a given terminal is very small.

In order to analyze the use of terminals installed in our country, 81 percent of them were studied in 1983. The study was conducted using a comprehensive survey card, which included 25 questions with respect to terminal time use, problems related to adapting the machine operators, how management workers view the use of terminals, and to what extent they satisfy their information needs. The study included the major part of economic

organizations which use terminals for information processing. Because of that, the study makes it possible to obtain a representative statistical sample, and thus the information gathered can be used for formulating conclusions and suggestions about the use of the terminals. Due to the fact that a significant part of the terminals are used for processing accounting information, the results of the study are valid and can be used in developing trends for transmitting this kind of information.

What characterizes the use of terminals in Bulgaria is the fact that a predominant portion of them, 58.7 percent, operate in two shifts; 37.3 percent in one shift; and only 4 percent in three shifts. The duration of dialogue with the computer, according to the types of terminals, is shown in Table 1.

Table 1 (in percent)

Type of Terminal	Duration of dialogue in one shift				
	up to 2 hrs	up to 4 hrs	up to 5 hrs	up to 6 hrs	over 6
ES 8501	12.5	25.0	12.5	25.0	25.0
IZOT 7925	--	--	--	100.0	--
SM-1604	--	--	--	--	100.0
Fakom-R	--	77.8	--	11.1	11.1
Fakom-1520	--	66.7	16.6	16.7	--
Bunker Ramo	--	8.3	16.7	60.4	14.6

As can be seen from the table, for all the terminals studied, the predominant time for dialogue with the computer is from 5 to 6 hours. It is necessary to mention that this is the time of dialogue of 48 percent of the terminals studied. At the same time, 14.7 percent of them are in dialogue with the computer for over 6 hours per shift. The relative number of terminals which have communication with the machine for up to 5 hours per shift (13.3 percent of the ones studied) is not a small amount. The existence of unused capacity is confirmed by the fact that 22.7 percent of the terminals are in dialogue with the computer on the average of up to 4 hours per shift, and 1.3 percent are used up to 2 hours. These are usually terminals which are used at the initial stage of building separate systems; their unsatisfactory loading, however, is a reserve for including new subsystems and tasks related to processing accounting information and it shows at the same time that organizational measures are needed for improving the use of terminals. Their loading is directly related to the number of messages exchanged. Table 2 shows the numbers from terminal to computer and from computer to terminal.

Table 2

Number of messages exchanged per shift	From terminal to computer	From computer to terminal
up to 50 messages	6.6	25.0
From 51 to 100 messages	9.2	7.9
From 101 to 300 messages	34.22	29.0
From 301 to 500 messages	34.2	31.6
From 501 to 700 messages	2.6	3.9
From 701 to 900 messages	7.9	2.6
From 901 to 1200 messages	5.3	—

The predominant number of terminals (from 60 to 70 percent) exchange from 100 to 500 computer messages, which determines the average loading of the machines shown in Table 1. The loading of the machines, however, depends, in addition to the number of messages exchanged, on their length as well. Table 3 shows the relative portion of their length.

Table 3 (in percent)

Length of one message in bytes	Relative portion
Up to 30 bytes	29.0
From 31 to 100 bytes	51.3
From 101 to 200 bytes	3.9
From 201 to 400 bytes	2.6
From 401 to 600 bytes	13.3

Messages with a length up to 100 bytes predominate at 80 percent of the terminals studied, which is an essential factor in projecting the duration of the dialogue with the computer and in determining the loading of the terminals so that they can be used effectively.

It should be pointed out here that better than average use of terminals is provided by realizing separate systems for processing accounting information. For example, the thorough study of the application of terminals at the State Saving Bank (which represents about 63 percent of the terminals studied throughout the country) shows that 85 percent of them have ensured loading for 4 to 6 hours, and 15 percent -- over 6 hours per shift; at the same time, 87.5 percent of the terminals in this system operate in two shifts. Obviously, gaining more experience and correctly organizing the information flow are conditions for effective use of the terminals. The efficiency of this system, in addition to the great social effect connected with cutting down on the time spent serving citizens, is also evident from the answers of the operators regarding the response

time. In an anonymous investigation, 95.8 percent of the operators answered that they found the response time while working at the terminals sufficient, 2.1 percent insufficient, and 2.1 percent rather long. Of course, the type of terminal used (videoterminal with keyboard), which satisfies the requirements for communication with the computer, is important in this case.

The use of terminals is characterized by ensuring the processing of accounting information in a "package processing" mode in some cases, and in time sharing in most of the cases, thus creating the possibilities for access to the data base and for obtaining information with a different degree of aggregation. Because of this, administrative and management workers with the necessary training can give a positive evaluation to the advantages of this hardware. Thus, 97.2 percent of the employees surveyed, who deal directly with the terminal, responded negatively to the question of replacing the terminal with a manual form of processing information. These are accounting workers who have been freed from performing labor-consuming computing operations. The personnel in this same category have also answered in the affirmative to the question: "Does the terminal you use allow the possibility of retrieving and inputting the necessary information into the computer?"

Whereas the accounting workers, who have been freed from executing time-consuming operations are convinced of the necessity of using terminals, the amount of management interest in this regard, according to the opinion of the employees, is as follows (see Table 4). The table shows the distribution, by type of terminal, of the answers to the questions about management attitude at the appropriate organizations toward using terminals, and the possibilities for retrieving additional information from the computer.

Table 4 (in percent)

Type of terminal used	What is the management interest in using terminals?			Do managers require addit. information from computers?	
	very inter.	inter-ested	indif-ferent	yes	no
ES 8501	75.6	24.4	--	24.4	75.6
IZOT 7925	100.00	--	--	100.00	--
SM 1604	100.00	--	--	100.00	--
Fakom-R	45.7	54.3	--	45.7	54.3
Fakom-1520	28.3	71.7	--	28.3	71.7
Bunker Ramo	83.4	16.6	--	16.6	83.4

Of all the people surveyed, 73.7 percent replied that their management is very interested in using terminals for processing accounting information, and 26.3 percent not interested. This shows that generally speaking, managers use information available through terminals well. The fact, however, that 75 percent of those surveyed responded that managers do not require additional information from the computer shows that the systems designed are not capable of satisfying their incidental needs for information and that the training of managers does not allow them to become acquainted with the systems and give orders for retrieving additional information. This requires attention being paid to the above-mentioned problems with respect to outlining the prospects for application of terminals to processing accounting information.

Obviously it is necessary, on the one hand, to improve the quality of the designs, the hardware of which makes the use of terminals possible. More concretely, it is necessary here to devote serious attention to the integration of software in the systems provided; the latter should be designed in a divided hierarchical system of interconnected machine carrier data bases, data base control systems, and data base access for the users. The tendency toward improving the software in processing accounting information means achieving data base compatibility at the different levels of management, as well as at a determined level for solving interrelated accounting tasks. For this purpose, it is necessary to develop the data base control system, to unify the software, and to formulate uniform requirements concerning the amount of information on the communication channels.

The prospects for practical adoption of terminals for processing accounting information are inextricably bound up with the training of accounting workers and managers. It is necessary to conduct differentiated training, depending on the degree of communication with the computer and the need for using information available through the machines. It is also necessary to train the personnel who prepare the data for transmitting and processing. Particular attention in the process of preparation should be devoted to the existing possibilities for management decisionmaking on the basis of information available through the use of terminals.

The trends in using terminals for processing accounting information are directly related to the modes of its transmission. The quality and speed of information services depend on them to a great extent. There are three transmission modes: in-line, off-line, and on-line, according to the method of transmitting information from the place it had originated directly to the computer or to the computer center, and the existing communication between humans and the machine. In the in-line mode, the information is transmitted by messengers of transportation means from the place it has originated to the computer center on original documents or machine carriers. It is characteristic for the off-line mode that data are transmitted by telex and machine carriers from the sites where the original information originated to the computer center, that is, an indirect transmission of information takes place. In the on-line mode,

there is a direct communication between the place where the information originates and the computer, and via the terminal, operative information is obtained.

The prevailing mode of information transmission in our country is in-line. The studies conducted show that the off-line mode is partially used at 30 percent of the computer centers, terminal stations, and the stations for the preparation, initial processing, and transmission of information; the on-line mode is used at 20.5 percent of them. At first glance, these figures reveal a comparatively satisfactory distribution of modes for providing automatic transmission of information. A more careful analysis, however, shows that these are only partial developments, which provide for automatic communication with the computer center or computer for several hours daily or weekly. Evidently, the need for using hardware (a complex of hardware devices and communication channels) and for developing designs aimed at increasing the amount of information, including accounting information transmitted in off-line and on-line modes, has become urgent.

Terminals will have wider and wider application in local networks for processing accounting information at enterprises and organizations in the spheres of production and labor not involved in production. Their importance for integrated administrative systems is also great, as it is in building differentiated systems for processing information with differentiated data bases. Of course, building each system should be done by taking into consideration the specific particularities of processing accounting information and the requirements set by the management system.

The physical distance separating the places originating and using accounting information within the management systems necessitates solving the problem of communication between humans and computers, which can increase the importance and role of using terminals.

12334

CSO: 2202/14

TRENDS IN MICROPROCESSOR TECHNOLOGY OUTLINED

East Berlin MILITAERTECHNIK in German No 3, 1984 (signed to press 9 Mar 84)
pp 156-157

[Article by Lt Col Dr M. Pardon, Engineer]

Manifold and sometimes far reaching are the changes which are currently occurring in the area of microprocessor technology in the GDR. The Chamber of Technology of the GDR addressed these changes when it decided, in 1983, to form the Scientific Section on Microprocessor Technology.

The Section on Microprocessor Technology is dedicated to the objective of delineating the significance of this technological branch for the economy and for public life in the GDR, of supporting its application, and of directing the available scientific-technical potential to focal points. To solve the above mentioned tasks, the section is organized in seven technical committees: microprocessor systems, multiprocessor systems, microprocessor circuit design, development systems/devices/process computers, technical languages and descriptive means, microprocessor interface systems, as well as microprocessor testing technology.

The priority tasks of the section are the following:

- to analyze the status achieved in the GDR in the area of microprocessor technology,
- to clarify current and perspective development problems for microprocessors, circuit families system design technologies, and testing technology,
- to make more effective the programming and use of technical languages,
- to improve applications and
- to formulate conclusions for manufacturers and users.

The ideas presented below concern some developmental trends in various technical areas of microprocessor technology. They should provide an overview of initial working results of the Section on Microprocessor Technology.

Microprocessor System Architecture

Starting from the idea that the computer architecture must reflect the requirements of the user, development is concerned with special peripheral switching circuits (interface processors). Thus, for example, the Z-80 System has four peripheral completion circuits, the Intel I 8080/85 has seven, and the iAPX 86 System has 26.

In terms of value, the universal processor relates to the peripheral switching circuits (without memory) like 1:2.7, including the peripheral units and office technology even like 1:10.

The interface processors largely perform standardized or user-specific software functions. These are permanently stored in the switching circuit and are often designated as programs in silicon (firmware).

Special processors and object-oriented architectures are initiating the transition to a fifth computer generation. The former operate, for example, with a real-time instruction set and dispense with the "von-Neumann control principle". In object-oriented architectures, it is not a data control but an event control that is implemented. The cellular systems, the "computing memo-rise", special language processors for more effective man-machine communication, and other solutions are likewise characteristic.

The GDR is currently emphasizing the development of complex microprocessors/microcomputer technologies, which will meet user requirements and which can be applied as a workstation computer, as a picture processing complex, as a voice processing unit, and the like. Thus, the 8-bit processor family U 880, which indeed forms the basis for the K 1520 microcomputer system among other things, has new and better characteristic data and design forms. Its clock-pulse frequency will increase and a CMOS variant is in preparation. The U 832 arithmetic processor and the single-chip microprocessor 881 are being tested. The OEM Modular System -1- will be further completed.

Arithmetic processors are primarily used for calculational solutions of numerical problems, to reduce the program processing time. A test of the U 832 by means of a K 1520-compatible module yielded a computing time reduction to one-tenth relative to the software solution.

A 16-bit processor concept with Soviet switching circuits (analogous to the Intel 8086 architecture) and GDR switching circuits (CPU 5 analogous to the Z 8000 architecture) is being introduced. On this basis, it is intended to develop a workstation computer system (ACS) with a modular structure and an assortment of modules primarily for OEM application, with the designation Microcomputer Module System 16 (MMS 16).

The K 1600 System will also be displaced. With the above mentioned CPU 5, the GDR development engineers already now have available a powerful 16-bit processor which can be used, with a K 1520-compatible conductor card, in existing development systems. This creates all the preconditions to gain experience for the creation of 16-bit software.

Multiprocessor Systems

The use of multiprocessor systems will be characteristic for future microprocessor technology. These systems consist of several interconnected microprocessors, memories, peripherals, and control circuits, as well as the linkage network. In this way, the computing effect is supposed to be exponentiated. Here, all the processors work in parallel and compete for system resources in the bus system.

The outstanding advantage of such multiprocessor systems lies in higher functional reliability (if component elements break down, others can take over their function), which is achieved by means of automatic self-diagnostics.

Design of Switching Circuits

In the future, design technology will only be computer-supported (CAD Technology) -2-. Even today, the design specialists no longer can manage all the problems which entail high and very high integration. A VLSI chip in 1982 contained about 250,000 transistors, but today the number already is several million.

In the future, the so called gate-array concept -3- and standard cell design will become especially interesting. By means of these, special customer switching circuits can be developed quickly and efficiently. Initial experience exists in the GDR .

Microprocessor Testing Technology

Testing technology and testing techniques are essential for further progress of microprocessor technology. As the integration level increases, the testing costs also increase. For an MSI switching circuit the testing costs make up 8 to 12 percent, but for a VLSI chip they make up 35 to 55 percent. At the present time, there are many-sided efforts to put the costs of testing technology in proportion to those of the manufacturing technology.

The testing procedures must be worked out and prescribed in a user-friendly fashion. The testing methodology must be co-delivered by the manufacturer. Every user of modules, for example of the K 1520 Microcomputer System, is well advised to check these modules for their functional capability after he has acquired them. Among other things, one can use the manufacturer-supplied test routine 0 with addressing test, bus test, and memory test.

Microprocessor Software

The basic test is to optimize the relation between the hardware and software of a microcomputer. It is the software that should always be emphasized here.

In the future, there will be more and more universal basis algorithms in the form of firmware. The objective should be to reduce the lack of system documentation, programs, and other user-related services.

As is well known, the efforts required for programming exceed the available working-force potential. Even today, the hardware costs bear a ratio to software costs of 1:4. The following guide values should clarify the software expenses. Let us assume that one program statement costs 20 Mark. One employee on the average can work out 10 statements in one working day (algorithms, coding, tests). As expenditure for an average user solution (25 TM hardware costs) one obtains 100 TM software costs, equivalent to 5000 program statements and 500 man days.

The crazy quilt of programming languages will remain. Even now one speaks of a "Babylonian confusion." Standardization or unification are scarcely observable. Indeed, more and more new languages are being added. However, in market computers, more effective, problem-oriented, higher programming languages will predominate. These languages are called higher languages and technical languages. Besides the familiar languages such as BASIC, FORTRAN and PASCAL, new ones will be increasingly used. As examples one might mention: PLZ, PL/M, the C-Language and ADA (the latter is optimized for the iAPX 432 Microprocessor System). Special real-time languages were developed for process control (e.g. MODULA) or existing languages were "converted" (e.g. PLZ/RTC).

The BASIC programming language is not losing its significance. Despite its well known disadvantages, it is now as before well suited to reduce communication problems of the untrained user with the microcomputer. With its completion to BASIC 80, the present programming language has been transformed into a powerful language.

The programming language FORTH has become known as the language of the fourth generation. It was created in 1976 for real-time operating systems and the virtual memory technology, and it is being used more and more. It is only 20 to 75 percent slower than assembler programs, but requires much less storage capacity. Its great flexibility - new instructions can be inserted without problem - and its conversational-mode capability should be emphasized.

Altogether, it is difficult to predict which languages will acquire the greatest practical significance. Similar statements can be made in the area of operating systems to control the microcomputers. The existing operating system SIOS 1520 is not very efficient and will not be developed further. The operating systems UDOS and CP/M, among others, have yielded good results in practical application and are becoming widespread.

For the user of microcomputer technology in the NVA (National Peoples Army), the point is to deal at an early stage with the developmental trends that have been briefly delineated here, and to prepare oneself appropriately for their use. Only in this way, will he be able to utilize fully and effectively the increased potential capabilities of the new products.

FOOTNOTES

1. OEM Original Equipment Manufacturer: original manufacturer of devices

(components, modules, etc) as a supplier for completing the final products.

2. CAD Computer-Aided Design. This is an important aid e.g. in the development of integrated switching circuits (IS). It comprises both the calculation of the actual electrical circuit and the topological design of the IS.
3. Gate Array: an arrangement of logical switching circuits (gates) which are "wired" and programmed in accord with specific customer requirements, by means of masks.

8348

CSO: 2302/58

BRIEFS

LASER USE IN NUCLEAR FUSION--Various methods for triggering controlled nuclear fusion are being pursued on an international level. One of these methods uses laser energy. In high-power laser installations, the laser beam is divided into a multitude of beams which are amplified and finally concentrated on a single point, the so-called target, in a laser fusion device. This requires highly accurate techniques for adjustments and control using a number of automatically controllable mirror and lens systems developed by the Central Institute of Optics and Spectroscopy of the AdW. These systems are also of importance for other tasks, such as the development of new optical elements and subassemblies and of the corresponding production technology. The picture on the right shows the engineer Reiner Hoffmann installing an experimental assembly for developing a computer-controlled focusing system for the Soviet laser fusion plant "Delphin." /Text/ /East Berlin NEUES DEUTSCHLAND in German 19-20 May 84 p 12/ 12693

GDR-USSR NUCLEAR FUSION COOPERATION--A high-capacity diagnostics station earmarked for studies at the Soviet nuclear fusion research facility Tokamak T-15 is presently being developed and built at the Academy of Sciences of the GDR. The experts of the Central Institute for Electron Physics are thus continuing their many years of participation in the complicated and costly fundamental research on controlled nuclear fusion conducted by the Institute for Atomic Energy "I. W. Kurchatov" in Moscow. /Text/ /Dresden SAECHSISCHE ZEITUNG in German 12-13 May 84 p 1/ 12693

SEMICONDUCTOR RESEARCH COOPERATION DESCRIBED--The Institute for Solid-State Physics and Electron Microscopy in Halle maintains extensive cooperative relations with research institutions at home and abroad. Together with the Polish scientist Ludwik Szczesniak, the physicists Horst Blumtritt and Klaus-Peter Meyer are engaged in studies of domain structures with the scanning electron microscope. Aside from good technical equipment, the institute has an experienced permanent staff, as well as an efficient facility for the construction of scientific instruments. In the course of the last few years a number of top achievements originated in the institute, such as the UHV photo electron emission microscope, an extremely sensitive capacitance meter instrument for the analysis of imperfections in semiconductors, as well as a high-resolution energy loss spectrometer which made it possible to open up new fields. Of special importance for the national economy are also systematic analyses of manufacturing flaws with the aid of scanning electronic microscope

fractography, from which information on avoiding such defects and their consequences in the future can be derived. /Text/ /East Berlin NEUES DEUTSCHLAND in German 12-13 May 84 p 12/ 12693

CIRCUIT BOARD ETCHING DEVICE--The etching of circuit boards is still of great importance for the national economy. In the following text we describe a spray-etching bath for medium and small-scale production developed and tested by the VEB transformer and X-ray plant "Hermann Matern". The commonly-known pressure spray-etching process system was installed in a medium-size bath. A high-capacity glass pump delivers ferric chloride via a pipe and jet system onto the circuit boards to be etched, which are moved and rest without any complicated clamping device on a carriage which permits one- or double-sided etching. A heater increases the effectiveness of the chemical reaction and a timer allows simple programming. The system makes it possible to process circuit boards up to a size of 350 x 350 mm. With an etching time of 2 to 5 minutes, depending on the saturation of the ferric chloride, a very good quality may be obtained. The bath is filled and emptied by the device's own pipe- and pump system. Almost all parts are manufactured of PVC, a few of myramid or steel. The electrical system is simple and cost-effective in design. Any mechanical shop can copy the entire facility. Maintenance and care are limited to a thorough weekly cleaning without draining the etchant. The jets and the heater must be cleaned when the ferric chloride is changed. The bath has proven its worth in 5 years of hard practical application in daily etching. The first symptoms of wear are only now appearing on the PVC material. Interested parties are requested to contact the Abteilung Neue Technik, Betrieb Rontgen, VEB Transformatoren- und Rontgenwerk "Hermann Matern," 8030 Dresden, Overbeckstr. 48. /Text/ /East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 32, No 7, Jul 83 p 411/ 12693

HOME COMPUTER HC 900 DEVELOPED--A Collective of young researchers from the VEB Mikroelektronik "Wilhelm Pieck" in Muhlausen has developed the electronic system shown by JUGEND+TECHNIK on the cover and several inside pages of its copy 5/84. HC 900 was the name given by the engineers and skilled technicians to their minicomputer which--connected to standard cassette or open-reel tape recorders as data storage and to a commercial television set as data display equipment--constitutes a complete data processing unit. The HC 900 can be used as both a scientific computer and an electronic dialogue partner for learning, but one can also utilize it for playing music, composing, storing archives and a few other things. JUGEND+TECHNIK not only explains technical details and the potential applications of this system, but it provides at the same time an insight into the work of those who brought this youth project to a conclusion in an extremely short time thereby producing patentable developments. /Excerpt/ /East Berlin NEUES DEUTSCHLAND in German 17 May 84 p 4/ 12693

FREELY PROGRAMMABLE GRINDING MACHINE--A short time ago the East Berlin factory "7th of October" began manufacturing a new gear tooth profile grinding machine "ZSTZ 06" with its own freely programmable control. East Berlin speaks of "considerable success in (export) sales." The VEB Numerik Karl-Marx-Stadt, which as the manufacturer of microelectronic controls was able to adapt to the specific requirements of the machine tool builders, is said to have a decisive share in it. In particular, it was said to be the freely programmable

control "PC 603" which permits about 20 variants. The adaptation to the gear tooth profile grinding machine was said to have been made within a period of 4 months. /Text/ /West Berlin IWE WIRTSCHAFTSDIENST in German Vol 25, No 16, 27 Apr 84 p 7/ 12693

NEW ANTICORROSIVE PRODUCT DEVELOPED--An anticorrosive agent bearing the name "Leuna-Hydral" was developed by a research collective in the VEB Leuna-Werke. The new product can be added to the heat transfer water, for instance in steam generating plants, as well as in heating and cooling systems for the purpose of separating the oxygen which leads to corrosion. "Leuna-Hydral" displays its complete effectiveness at a temperature of only 20°C, whereas the conventional anticorrosive "Hydrazin" demonstrates its complete effectiveness only at temperatures of about 100°C. Within a period of 10 minutes in the pH range of 8.5 to 10.5 "Leuna-Hydral" decomposes at least 90 percent of the oxygen dissolved in the water, resulting in a substantial decrease in the rate of corrosion. No adverse side effects are caused by this agent in steel, copper, and its alloys. /Text/ /Leipzig LEIPZIGER VOLKSZEITUNG in German 12-13 May 84 p 10/ 12693

NEW PROGRAM CONTROL UNIT--Karl-Marx-Stadt (ADN). The new industrial robot control unit "IRS 700 K" makes possible lower programming expenditures and longer work periods for articulated robots. It was developed by the VEB Numerik in Karl-Marx-Stadt jointly with the Institute of Technology located there. The program control unit permits the utilization of welding and assembly robots at the most varied work speeds on straight, circular, and helical paths. At the same time, programming equipment with a view screen was developed for it. /Text/ /East Berlin NEUES DEUTSCHLAND in German 14 May 84 p 3/ 12693

MOLECULAR COMPOUND RESEARCH REPORTED--Significant advances in knowledge while observing the whole spatial structure of biological effector molecules, especially of the so-called key compounds, were made by Prof Dr habil. Ernst Hohne of the Central Institute for Molecular Biology of the AdW of the GDR. His studies centered on vegetable biocatalysts, such as solanum alkaloids and gibberellins, as well as cardiac muscle biocatalysts (steroid lactones) and model substances for the determination of the H-bridge geometry. Precise data were obtained on the linkage distances and linkage angles of the molecules which permit deductions on systematic structural properties within the individual substance categories. Of outstanding importance--also with respect to the practice of some cooperation partners--was the clear determination of the absolute configuration in asymmetric centers, of the type of ring linkages (cis-, trans-), and of the position of the lateral groups (α -, β -). This permitted, for instance, deductions with regard to the steroid alkaloid Veralkamin as a new basic steroid framework. For the epiminocholestanes, the previous rules regarding the interpretation of findings of the optical rotation dispersion (ORD) had to be changed on the basis of the structure-analytical results. The results of the fundamental work of Professor Hohne are incorporated in new active vegetable and cardiac-effective substances. They will also deepen the understanding of the connection between the spatial structure of the molecules, their biological function and their chemical properties. The scientist was awarded the Walter-Friedrich-medal of the Academy of Sciences of the GDR for his work. /Text/ /Leipzig URANIA in German No 3, Mar 84 p 36/ 12693

HUNGARY

ACADEMICIAN EXPLAINS, STRESSES IMPORTANCE OF BIOTECHNOLOGY

Budapest PARTELET in Hungarian No 6, Jun 84 pp 31-35

[Article by Istvan Lang, deputy first secretary of the Hungarian Academy of Sciences]

[Excerpts] Fields of Application

In the field of the pharmaceutical industry we have considerable domestic traditions. The basic steps of the fermentation technique have already been developed by the end of the 1940's. With some products--for example vitamin B₁₂--the Hungarian pharmaceutical industry appeared as one of the first even on a global scale. In the 1960's, our pharmaceutical industry achieved considerable successes with the use of microorganisms in the field of chemical restructuring. The application of these advanced methods in therapy remains an important goal.

New possibilities arose with the gene splicing procedures. One of these is the production of human insulin by means of bacteria. Early this year, nice results were reported by workers of the Biological Center in Szeged: they produced a bacterium which produces insulin. Although the domestic pharmaceutical industry does not as yet produce insulin by means of gene splicing, nevertheless, the conceptual possibility already exists for this process. Interferon is the other compound where production by means of gene splicing can be expected. At the present time, interferon is extracted from human blood by means of a very costly process. The production of growth hormones by means of a gene splicing procedure has also been accomplished already in several countries. It can be expected that soon this method will also be applied in Hungary. Use of the hybridoma technique also belongs among the biotechnological procedures--the crossing of cells which then produce a special antigen. These antigens furnish new possibilities for enhancing the natural resistance of the organism. Veterinary medicine also expects a great deal from this technique.

Biotechnological procedures have long been used in the food industry. Alcoholic fermentation provides the means to process agricultural products and certain wastes to make alcohol. The canning, dairy and beer industries use various enzymes--complex proteins with a fermenting effect, accelerating various biochemical processes--for the individual

production procedures. These are produced from microorganisms and they are also suitable for catalyzing the processes in an isolated, purified form; furthermore, they exert a favorable influence on product quality. Therefore, the application of modern biotechnological procedures is an important factor in the competitiveness of the domestic food industry, the more so, because a significant part of the enzymes is currently imported from abroad, mostly from capitalist markets.

There is a great problem in animal raising with the supply of proteins, which we have less than needed, and thus we import some of it. Although the foreign currency obtained from the sale of animal products can be used to supplement the costs of imported protein, nevertheless, the goal is to lower this sum considerably. Biotechnology is also promising results in this area. Under favorable conditions, the microorganisms are capable of very rapid growth and the microbial biomass formed has a high protein content. Fodder yeast has been successfully produced for a long time. We also hope that, through biotechnological research, materials high in cellulose--such as corn stalk--will also become useable. Using various fungi, they have already achieved promising results in enhancing the protein content of corn stalk.

There are Hungarian research results of a pioneering character in the production of leaf proteins from various plants. This method will most certainly gain more considerable practical use if the price of feed-protein continues to increase further on the international markets. In the protein balance of our animal raising, there is a lysine deficiency and, therefore, the fodder has to be supplemented with this missing amino acid. This material is produced in microbial cultures, and we are not producing any domestically at this time but import the whole amount needed. This situation cannot be maintained on the long run.

Production of the various compost fertilizers also is done with the help of microorganisms. In recent times, the production of biogas has also come to the foreground. Using this method, an energy carrier can be produced from organic manures and wastes. This procedure also satisfies environmental protection requirements because the manure treatment takes place in a closed and controlled system. Microorganisms which utilize hydrocarbon compounds as their nutrient medium have also been used with success for oil pollution control.

The program for the development of biotechnological research was put in the National Intermediate-Range Research Development Plan under the title: "Research, development and application of biotechnological procedures in agriculture and in industry."

Domestic Possibilities

In the economy of our country, there has always been considerable profit derived from the production, use and sale of materials of biological origin. Agriculture, the food industry, the pharmaceutical industry and the few industrial branches processing materials of biological origin

provide about one-fourth of the national product. The resources of the country are suitable for further increasing the primary biomass (plant) production. Today, Hungarian agriculture can boast with successes and international recognition not characteristic of every other production area. Biotechnology provides another possibility in designating the trends of long-range economic development.

The projection of the long-range national economic development was recently completed and it was also discussed by the Council of Ministers. Among the developmental tasks of strategic character, the following topics are given priority: the agroecological potential, the biopotential complex and its effective utilization, the related food-economy, industrial production and supply activities, the biotechnological procedures, and the research-development and foreign trade activities related to all of the former. Among the developmental projections, lasting priority is enjoyed by the production and manifold utilization of materials of biological origin.

On enumerating our possibilities, it also must be noted that the governing share of the national product, even in the future, will not be agriculture or foodstuffs. Their current share will probably increase because they are expanding very dynamically but the greater part of the national product will always be provided by industrial production and service. At the same time, the general attitude of the people and social stability are considerably improved by a satisfying and varied food supply.

Our country is self-supporting with respect to foodstuffs and 25 percent of our products are exported. Thus, a further increase in production will largely expand the stock of export goods. At the same time it is also true--being a small country--that the amount of exported products will not shape the international markets.

One of the key issues of the further development of Hungarian agriculture is how it will adapt better, faster and more flexibly to the various future conditions; to fluctuations in natural conditions--primarily the climate--; to the advancement of production technologies; to changes in social demands and, most of all, in the foreign market. An agricultural system adapting to the changed conditions and, furthermore, a plant and animal raising system are needed which will rapidly and well adapt to nature, technology and social demands. With this system must be linked the complex development of the industrial branches for which the scientific and technical base is provided primarily by biotechnology. It is possible that the biological production over and above the supply of the population will continue to reach the foreign markets basically in the form of foodstuffs, but it is also possible that, in the future, it might become expedient to gradually increase the proportion of the various raw materials and industrially processed products of biological origin which can be sold at a greater profit and with more certainty. Very careful and foresighted evaluation is necessary for the further elaboration of such a concept.

BRIEFS

NUCLEAR RESEARCH INSTITUTE CYCLOTRON--Of the 300 persons and 100 graduate specialists currently employed at ATOMKI [Nuclear Research Institute] in Debrecen, one-third conduct basic nuclear physics research; one-third, interdisciplinary research while one-third are involved in practical applications and construction of instruments. The only scientific large investment of ATOMKI is the cyclotron currently being built with the aid of the International Atomic Energy Agency. ATOMKI has a neutron generator, a 5 million-volt Van de Graaf generator capable of attaining 6 million volts. Internationally, ATOMKI has been among the first to demonstrate the presence of neutrinos through use of cloud chamber photography. [Text] [Budapest MAGYAR HIRLAP in Hungarian 28 Jun 84 p 8]

MICROCOMPUTER CONTROLS ENTIRE TECHNOLOGY--VEGYTERV [Chemical Works Planning Enterprise] has developed a control system capable of automatically controlling and monitoring various technological processes through use of a microcomputer. The system permits control and monitoring of complete production lines. The device notes deviation from specifications and immediately interrupts a process by opening valves, changing feed rate or temperature. The computer stores everything in its memory thereby simplifying subsequent analysis. Centralized monitoring and control of all facets of a technology can greatly improve productivity. In the past, this has been possible for only certain main operations. Successful evolution of the VEGYTERV system is due in part to the VBKM [Electrical Equipment and Electronics Enterprise, Villamos Berendezesek es Elektronikai Vallalat] which cooperated with VEGYTERV in designing the necessary module elements from a previously successful basic construction. VBKM will continue to deliver module elements for the microcomputers. Great interest has been manifested in VEGYTERV's novel system. Its originator will now act as prime contractor. In the near future, VEGYTERV will begin developing a central control system for production of a type of gas solution at the Tisza Chemical Combine [Tiszai Vegyi Kombinat]. [Text] [Budapest MAGYAR HIRLAP in Hungarian 29 Jun 84 p 7]

TOOL DESIGNING COMPUTER SYSTEM--Specialists of SZTAKI [Research Institute for Computer Technology and Automation] have developed a computer system which can plan and produce designs for tools and parts. Industry frequently needs parts the shape of which cannot be described in traditional terms such as flat, cylindrical or spherical. Special computer devices greatly facilitate the design and production of such non-conventional parts. By using the system evolved by SZTAKI, the user can plan the shape of the part step by step through instructions given to the computer. He can monitor the evolving design continuously on the computer display. [Text] [Budapest MAGYAR HIRLAP in Hungarian 30 Jun 84 p 3]

MONITORING, DISPOSAL OF RADIOACTIVE WASTE--There are 7 telemetering stations and 22 permanent stations in a 30-kilometer radius of the Paks nuclear power plant. They measure the level of radiation in the atmosphere, vegetation and water. The environmental control laboratory analyzes 3,000 samples annually. International experience indicates that radiation in the vicinity of nuclear power plants is far below permissible levels; emanation is barely 1-2 percent of natural background radiation. Fortunately nuclear power plants, including Paks, generate radioactive waste having a half-life of only 30 years. However, the waste must be disposed of as if its half-life were 600 years. Highly active radioactive solids are stored in the power plant itself, possibly permanently. Solid wastes of low or moderate activity are enclosed in polyethylene or metal containers for shipment to temporary storage sites. Radioactive waste water is collected in a pit which it reaches via a specially built system of pipes. From there it is pumped into a reservoir, sedimented, filtered and condensed. Hungary solidifies the wastes by embedding them in cement which is either shaped into blocks or poured into metal barrels. The embedded wastes are then shipped to the isotope cemetery for final storage. Hungary has had isotope cemeteries since 1950, first at Solymar and then at Puspokszilagy beginning in the sixties. Here the embedded waste is placed into concrete basins in clayey soil which are covered with earth when filled. The cost of disposing of radioactive waste is high: it costs about 50,000 forints to finally dispose of and monitor 1 m³ of material for 10 years. [Excerpt] [Budapest MAGYAR NEMZET in Hungarian 22 Jun 84 p 9]

CSO: 2502/68

NEW COMPUTER DEVELOPMENTS DESCRIBED

Elwro-523 Minicomputer Production

Gdansk GLOS WYBRZEZA in Polish 18 May 84 p 1

/Article: "The First Polish Microcomputer for 2 Million Zlotys; An Opportunity To Improve Management"

/Text/ The crew of Wroclaw's Elwro electronics enterprises--who are celebrating the 25th anniversary of production activity--have completed in the middle of this month the assembly of a test run of 25 units of the first Elwro-523 type minicomputers. For the fourth quarter of this year, the plans project a serial production of 150 machines. It is projected that about 500 microcomputers will be produced in 1985 and over 1,000 units annually in subsequent years.

The initiation of microcomputer production at Wroclaw's Elwro plants begins a new stage in the history of this factory. The Elwro-523 computer uses the latest achievements of Polish technology, including highly integrated circuits and Polish microprocessors manufactured by CEMI /Scientific Research Semiconductor Center/.

The latest Polish microcomputer from Wroclaw is especially designed for use by accountants, banks, small enterprises and institutions. The machine's small size facilitates its direct use with a work station. In the opinion of Elwro's designers, this latest Polish microcomputer should be very useful in improving organization and management, and in assuring higher work quality. The manufacturers at Elwro also guarantee that the Elwro-523 will not cost more than 2 million zlotys.

Establishment of Interschool Computer Network

Warsaw PRZEGLAD TECHNICZNY in Polish No 23, 3 Jun 84 pp 29-30

/Article by Jozef Lewoc: "The Interschool Computer Network"

/Text/ The design and construction of a computer network is a very complex undertaking. It requires the proper coordination of many technical, scientific research, didactic and organizational activities of a diversified nature.

Wroclaw Polytechnic has many years' experience in designing and building an MSK /Interschool Computer Network/. Some of these experiences have been described in the context of two types of approaches to realize an undertaking: "from the bottom to the top" and "from the top to the bottom."

The first approach (recommended) is based on establishing a sequence of goals (utilitarian, cognitive, didactic and general) and the gradual realization of these goals (during development). This version was used to establish the details concerning the Uniform System machines for the MSK and the method to expand MSK network services. In this approach, the user is the center of interest, and the network should be created as a string of thread having well-defined utilitarian goals.

The second approach, which was accepted de facto for the MSK, is based on starting work with a defined general goal in mind and reducing the entire project into tasks that are realized automatically, that is, with weak "tiered towers." With this approach, the building of a network leads to preparing a collection of hardware and software, hoping that after completion a good network is achieved that fulfills users' needs.

In realizing the MSK thus far, many misunderstandings have arisen among the individual groups realizing the subtasks concerning the so-called conceptual problems and coordination of tasks. These conflicts could and should be eliminated because they impede the realization of the MSK. They often are the result of misunderstandings and not objective premises. The MSK goals must be clearly reasserted and resolutely realized as best and quickly as possible.

To realize the MSK network, the following goals are presented:

--utilitarian: assuring the employees of the various schools and scientific-research institutions convenient access to computer facilities located at various places in Poland and abroad;

--cognitive: investigating the resources and methods for building a network that are possible to use in Poland's circumstances and developing methods for designing and implementing subsequent computer networks;

--didactic: training specialists capable of designing and implementing telecommunications networks.

These goals will provide the fastest and most efficient implementation of computer technology in various areas of life. With such a general goal, the network becomes one of the most effective ways of using information science in various areas of the national economy.

For now, Poland lacks the properly experienced specialists to permit all the goals of the MSK network to be realized quickly. The foreign experiences that could be used do not take into account our country's specific circumstances that have a decisive influence on the entire

project. In my opinion, this experience can be obtained only by the inductive method, step by step, by realizing increasingly bigger goals, starting with the utilitarian goal and ending with the general goal.

The technical, economic and organizational circumstances that are specific to our country make it impossible to estimate reliably the number of users that we will be able to access and the types of resources that we will be able to offer with the MSK. Also, it is not known too accurately how to do it.

In this state of affairs, selecting the first network user is very important, offering him "nontrivial" network services and the organization of a group to implement this service. Such a user should be selected from outside the group of information scientists involved in realizing the MSK network but who have experience in using computer equipment. This group must be presented with a common goal: how to satisfy the user's requirements as best and quickly as possible using existing capabilities. Common criteria to evaluate work results must also be used, namely, the usefulness of the realized service to that user.

Presently, access to INTE scientific and technical information is the most promoted service of interest to all scientists. Wroclaw Polytechnic's library has computer INTE data bases and provides extracts from these bases in the off-line mode. Immediate access to data of interest is a much more complex service that, undoubtedly, is needed by scientists. The appropriate processing systems are now ready and should be available soon.

If we offer such a service to a Warsaw user, then we must assure the resources and means of realizing this service. Transferring the INTE bases is not advisable because of the high outlays of personnel and funds needed to establish and maintain these bases and the time required to organize them. A more sensible solution would be to assure this user access to the Wroclaw computer system. In association with this a terminal should be installed at the user's location and communication between the user and Wroclaw's Odra 1305 computer must be assured. Direct communication, which should be used during the first stage, is inconvenient for the long run because it limits access exclusively to the resources of a single computer system and incurs very high operating costs (the costs of the communication equipment and connections). Therefore, the user should have access to a local computer system; he should have access to the Wroclaw system only in case of need.

The group involved in preparing the MSK network is also concerned with the Odra 1305 system installed at the PAN /Polish Academy of Sciences/ IPI /Institute of Principles of Information Science/. Thus, the user must be assured access to this system. For users' service to be effective, they must have access to the Odra 1305 computer via a main processor. Currently, the main processor for the Odra 1325 computer

(developed by Wroclaw Polytechnic's Institute of Engineering Cybernetics) can be used. The purchase of a main processor from ICL is out of the question because of foreign exchange constraints and the technical difficulty of implementing changes in the processor which may be necessary when realizing the mentioned service.

Communication between the PAN IPI computer and the Wroclaw Polytechnic system must be provided in such a way as to permit the selected user effective operation. One of the important elements that must be considered here is the fact that the data bases assessed at Wroclaw Polytechnic are incomplete (because of hardware limitations). Thus, easy access to foreign INTE data bases must be assured. When building links between the discussed computer systems, the latest international recommendations concerning such links (CCITT recommendation X.25) should be adopted. The adoption of principles that are mandatory for SNA (System Network Architecture) would limit the possibility of direct access by our user to the network developed by IBM (IBM is already implementing software to permit connection of its equipment to X.25-type networks).

The selected user can access the Wroclaw Polytechnic system (and foreign systems) via an Odra 1305 computer or an Odra 1325 main processor. The first solution is more difficult to implement because it would require the modification of the developed GEORGE 3 operational system, which controls computer operation. In addition, the computer would have to service the needed communication equipment, which involves very extensively its computational power. Thus it is sensible to realize the task by redesigning the main processor to be a communication computer which will realize its previous function (servicing the local system terminal) without noticeable changes, and would also permit contacts with other computer systems.

The adoption of the X.25 recommendations requires that the computer be equipped with a synchronous line adapter that is capable of operating in accordance with the High Level Data Link (HDLC) protocol. Such an adapter has been prepared by Wroclaw Polytechnic's ZANID /Scientific and Didactic Apparatus Department/. The limited memory capacity of the communication computer and the relatively complex program service of the peripherals used with the EX2M executive program make it impossible to communicate with more than one remote computer system, as occurs, for example, in the ARDA network. Thus, to enable the user access to various systems, an additional intermediate element is needed: a packet commutation station.

The task of finding such a solution has been entrusted to the PAN IFI, Wroclaw Polytechnic and Silesian Polytechnic's IPI. I believe that building the network will present so many problems that doubling the work, especially during the first period, makes no sense. Combining efforts to accelerate the realization of the pilot implementation of the network appears to be more justified. Certain activities in this direction have already been undertaken and have produced many benefits

(accurately specifying the X.25 recommendations for the MSK network, exchange of experiences among experts from various centers involved in realizing the MSK network).

The MSK network requires the use of a computer that has very large computational capabilities and that is as cheap as possible. Selecting the SM-3 microcomputer was justified because at the time the decision was being made concerning essential purchases, the SM-3 was a realistically available microcomputer that would enable the station to be built as quickly and economically as possible. Work on building the SM-3 based station (building a line adapter for the HDLC and developing necessary software) was executed, and in this way it was possible to realize the described service as quickly and cheaply as possible (since the hardware has been already purchased), even though it is now possible to use Polish-produced hardware (the EC 8371 and the Mars 400 minicomputers and the Mera 60 microcomputer).

To realize the proposed service more quickly, the 1200/2400 band modems that are available on the market should be used. Greater transmission speeds will be needed because the network will be used intensively by a greater number of users. A direct result of the proposed solution is to build in Wroclaw a second station and a communication computer that permits convenient access to the computer with INTE data bases.

The resources and methods needed to realize the discussed service define the first thread with which realization of the MSK network should be initiated. The first thread should develop in two directions. First, access to the foreign INTE data bases should be assured. But for the long term this solution is too costly (although permissible during the experimental work stage). Developing the data bases maintained at Wroclaw Polytechnic is a better way to go. Here the computer's capabilities are the limiting factors. Thus, the work being done to transfer the INTE data bases to the R-32 computer (which has a greater capacity than the Odra 1305) is quite justified. Also, work must begin quickly to make the second computer accessible to the user. This, however, is a theoretical assumption because the shortcomings of the OS-MVT operating system effectively make it impossible to utilize the R-32 resources fully. These shortcomings must be eliminated if we want to consider using the R-32 computer in the networks or in the more complicated multiaccess systems. This goal can be achieved by developing the proper software for the EC 8371 teleprocessing processor produced by Mea-Elwro, which would allow the processor to function as a communication processor for the R-32 system with connections to a X.25-type network.

We must proceed further; for example, along the path taken at Cambridge, where they replaced the commercial TCAM system with their own PARROT system, which is more suitable to the needs of school networks (despite the popular opinion that such a task is too labor intensive--perhaps even no more so than adapting IBM software for the R-32 computer).

Combining the station and communication computer functions does not appear to be advisable because it impedes the tasks realized during the previous stage, and in the future one can expect a need to link the RIAD family of computers to general-purpose, autonomous communication subnetworks.

The second direction of development for the first thread should be conducted from the bottom up, from the scientist using the services of the MSK network to the branches of the national economy for whose good the scientist is working. In particular, it will be necessary to create computerized research laboratories and to connect the MSK network with the computer systems installed outside the academic centers in order to investigate the problems that will arise during the building of such networks. During the first stage, it would be advisable to connect the MSK network to the power industry's computer network in view of the power industry's highly advanced computerization. Other network services can be verified and implemented relatively quickly with the prepared hardware. The following services should be possible, especially during the initial stage of realizing the network:

--access to Wroclaw's library of scientific and technical programs by users in Warsaw;

--access by users in Wroclaw to the data processing systems operating in Warsaw.

This type of network service is needed by scientists in all centers; thus, the MSK network must be expanded gradually, making it more popular. Threads from the user to the data processing system--similar to the pilot thread--should always be formed, realizing ultimately the given service. Designating the distinct completion of the first stage of building the MSK network, that is, the tri-station network (known earlier as the Pitagoras network), makes sense.

To complete the construction of the first stage of the MSK network quickly, the hardware on hand that was tested out when realizing and testing the first thread should be used. Similarly, the MSK network development data should also be realized thread by thread, permitting more extensive network services to be implemented.

The groups realizing subsequent MSK network threads should also make use of the experiences obtained in preparing and exploiting earlier threads. In association with this, it will be necessary to use available domestic hardware to the greatest extent possible. Stations, terminal concentrators and communication processors for the domestic minicomputers (Mera 400, EC 8371 and others), the increasing use of the significantly more economical large-scale integrated devices, including microcomputer systems, are especially necessary.

This requires that work on using microprocessors in the MSK on a universal scale be started immediately.

The creation of the interschool network will form the base for the creation of a national network. By building, exploiting and investigating a smaller network, the hardware will be thoroughly tested, various network problems will be thoroughly investigated and resolved, and effective norms and recommendations will be developed. At the same time the qualified cadres needed to implement network methods in Poland will be trained. Expanding the MSK network beyond academic circles will permit scientists and students to become better acquainted with the real problems occurring in various activities of the economy.

Solutions that are similar to those presented for the MSK or solutions that are "mixed" are used in the world at large. Two distinctly different methods can be observed. They are based on the Tymnet network (the largest network in the world with packet commutation) and the PSS (Public Switching Service) network in Great Britain. In the former, Tymshare quickly initiated the network (the top-down method permits this) and made it available to the transport services, monopolizing the market in the United States and Europe for quite a long time. As a result, the service is very expensive, and Europe was broken up into a collection of disconnected "islands" that communicate with one another via the United States exclusively.

In the British case, a cautious approach was taken. First, British Telecom built connections (details) from multiaccess systems, and then the Experimental Packet Switching System (EPSS) was built, with which they gained experience concerning protocols and concepts for network solutions. Based on this, a Packet Switching System (PSS) was built having a capacity suitable for current needs, and plans were developed to expand the PSS to satisfy the projected growth in demand. As a result, an economic and flexible system was achieved.

In the socialist countries, Bulgaria adopted the most sensible approach; it has built a national management system, in operation for several years, that uses the DOS and CICS subsystems for a simple communication subnetwork. Obviously, they assumed that their country is too poor for experiments on a large scale that do not produce concrete results in a short time. The theoretical ease of controlling and the rapidity of realizing projects, which Tymnet uses in its network, are advantages of the top-down method. In our case, however, the interests of the users should be the deciding factor and not the profits of the likely network subnetwork operators. In addition, with a lack of network experience, control via the top-down method is difficult, and wrong decisions often cause delays which can be avoided by using the down-up method. Thus, the concluding postulate is the wish that before work has been completed

on the MSK a real group will be formed in place of the loose agglomeration of groups now building the MSK network. To date, this agglomeration does not include a system user, and the results are being evaluated by the managers of their superiors involved in building the MSK network, without verification by the ultimate users for whom, after all, all this is being done.

11899

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DEVELOPMENT OF MICROELECTRONICS DESCRIBED

Warsaw ELEKTRONIKA in Polish No 2, Feb 84 pp 31-33

[Article: "A Seminar on Microelectronics and Social and Economic Development"]

[Excerpt] From 29-30 September 1983 electronic engineers from scientific institutes, designers from electronic equipment plants, representatives of the social sciences, members of the NOT [Chief Technical Organization] Committee for the Electronization of the National Economy and members of the Planning Commission met for a working seminar entitled "Microelectronics and Social and Economic Development." The organization of this meeting was the joint undertaking of three institutions: the Association of Polish Electrical Engineers, the PAN [Polish Academy of Sciences] and the CEMI [Scientific Research Semiconductor Center] Institute of Electronic Technology.

The seminar took place at a very important time for Polish microelectronics because this year the production of the MCY 7880N 8-bit microprocessor has been mastered. The representatives of science, technology and other branches resolved to discuss jointly the possibility of using microprocessors and thoroughly discussed the multilateral effects in the social, economic and political spheres of using microprocessors.

In view of worldwide achievements, the state of our electronics indicates that our national economy faces a growing threat in this area. The greatest danger is the lack of dynamic development, which is causing us to fall behind relative to the leading countries. We lag especially in the application of microprocessors for automatic production control systems, for systems to control the consumption of energy and raw materials, and in the introduction of microelectronics in programs for extensively used services.

In his presentation, Prof Dr Hab Eng Stanislaw Paszkowski presented, among other things, a list of values of electronic production in Poland for 1980 and 1982 (Table 1) and a list of sales per capita of electronic products for various countries (Table 2).

Table 1. Sold production and exports of Poland's electronics industry for 1980 and 1982 (1982 prices in billions of zlotys; 1 dollar = 86 zlotys)

Produkcja sprzedana (1)	1980		1982	
	mld zł	mln \$	mld zł	mln \$
	(10)	(11)	(10)	(11)
Wyroby elektro- niczne zgrupowania UNITRY (2)	97	1128	97	1128
w tym eksport (3)	15	174,4	11,9	138,4
ESPU (4)	37	430	40	465
Podzespoły, ma- terialy i urządzenia specjalne (5)	41,4	481,4	40	465
Komputery, auto- matyka i urządze- nia pomiarowe (6)	35,2	409,2	36,1	419,8
w tym eksport (3)	10,3	119,8	17,4	202,3
środki łączności (7)	17,10	198,8	15,30	177,9
w tym eksport (3)	5,61	65,2	6,40	74,4
Sprzęt medyczny (8)	2,05	23,8	2,365	27,5
w tym eksport (3)	0,72	8,4	0,762	8,9
Aparatura nauko- wo-badawcza (9)	3,6	41,9	3,6	41,9
Razem produkcja sprzedana	155	1802,3	154,4	1795,3
w tym eksport	31,6	367,4	36,5	424,4

Key:

1. Sold production
2. Unitra's electronic products
3. Including exports
4. ESPU
5. Subassemblies, special equipment and material
6. Computers, measuring equipment and automation devices
7. Communication equipment
8. Medical equipment
9. Scientific research apparatus
10. Billions of zlotys
11. Millions of dollars

Table 2. Sales of electronics products per capita for selected European countries (dollars/capita)

(1) Kraj	Wszystkie wy- roby elektroniki (8)	Podzespoły (9)
RFN (2)	290	56,7
Anglia (3)	215	36,6
Francja (4)	234	40,5
Włochy (5)	124	12
Hiszpania (6)	50	10
Polska (7)	50	12

Key:

1. Country
2. FRG
3. England
4. France
5. Italy
6. Spain
7. Poland
8. All electronic products
9. Subassemblies

During the second day of the seminar, the attendees heard a presentation given by Prof Dr Hab Eng Andrzej Kobus, entitled "The Status and Trend of Microprocessor Development in Poland." A family of 8-bit general purpose microprocessor chips was acknowledged as the base for the set of commercial integrated circuits. A counterpart of the most popular microprocessor in the world during the 1976-1978 period, the Intel 8080A, was selected.

The set of 8-bit microprocessor chips is based on two technologies: NMOS and TTL with Schottky diodes. Table 3 presents the set of microprocessor chips, their functions and their development history.

During the 1984-1985 period, it is anticipated that the primary trends in the development of microprocessor chips will be:

--one chip 8-bit microcomputers;

--a set of bipolar chips that operate in conjunction with a 16-bit microprocessor;

--additional memory chips.

The 4-bit one-chip microcomputer will process 1- and 2-byte instructions and will include:

--a 1,024 X 8-bit ROM;

--a 64 X 4-bit RAM.

Two basic versions of single-chip 8-bit microcomputers are projected;

--the MCY 7335, a microcomputer without an internal ROM designed to emulate systems or for use with external ROM's or with reprogrammable EPROM's;

--the MCY 7848, a microcomputer with an internal ROM that is programmed via a mask by the manufacturer and designed for special applications.

Figure 3 presents the different classes of microcomputers and microprocessors. The domestic microcomputers and microprocessors in production or in development are enclosed in solid lines. Based on Figure 3, it can be stated that:

--a family of 8-bit general purpose microprocessors using the MCY 7880 central processing unit became available to domestic users in 1983;

--the other three classes of microprocessors will be available to domestic users by 1985, mainly the 4-bit MCY 7804 and the 8-bit MCY 7848 single-chip microcomputers. In addition, circuits that belong to the Intel 8086 set of circuits for the 16-bit general purpose microprocessor, but without the same microprocessor circuit, will be available. A counterpart of the microprocessor, called the K 586, is available in the USSR.

Table 3. Set of general purpose 8-bit microprocessor chips

Typ (1)	Funkcja (2)	Termin wdrożenia (3)
MCY 7880 (4)	jednostka centralna/mikro-procesor	w produkcji (13)
UCY 74 S 424 (5)	generator zegarowy	w produkcji
UCY 74 S 428 (6)	kontroler systemu	w produkcji
UCY 74 S 412 (7)	8-bitowy port WE/WY	w produkcji
MCY 7851 (8)	szeregowy układ WE/WY	1983
MCY 7855 (9)	równoległy układ WE/WY	w produkcji
UCY 74 S 414 (10)	kontroler priorytetu przerwań	w produkcji
UCY 74 S 416/26 (11)	4-bitowy nadajnik-odbiornik	w produkcji
UCY 74 S 405 (12)	dekoder 1 z 8	w produkcji
MCY 7102	Stat.-RAM 1 × 1K	w produkcji
MCY 7114	Stat.-RAM 4 × 1K	1983
MCY 7304	ROM 8 × 512 b	w produkcji
MCY 7316	ROM 8 × 2K	w produkcji
MCY 7716	EPROM 8 × 2K	1984

Key:

1. Type
2. Function
3. Introduced
4. Central processing unit
5. Clock generator
6. System controller
7. 8-bit I/O port
8. Series I/O circuit
9. Parallel I/O circuit
10. Controller for priority of interruptions
11. 4-bit transceiver
12. 1 z 8 decoder
13. In production

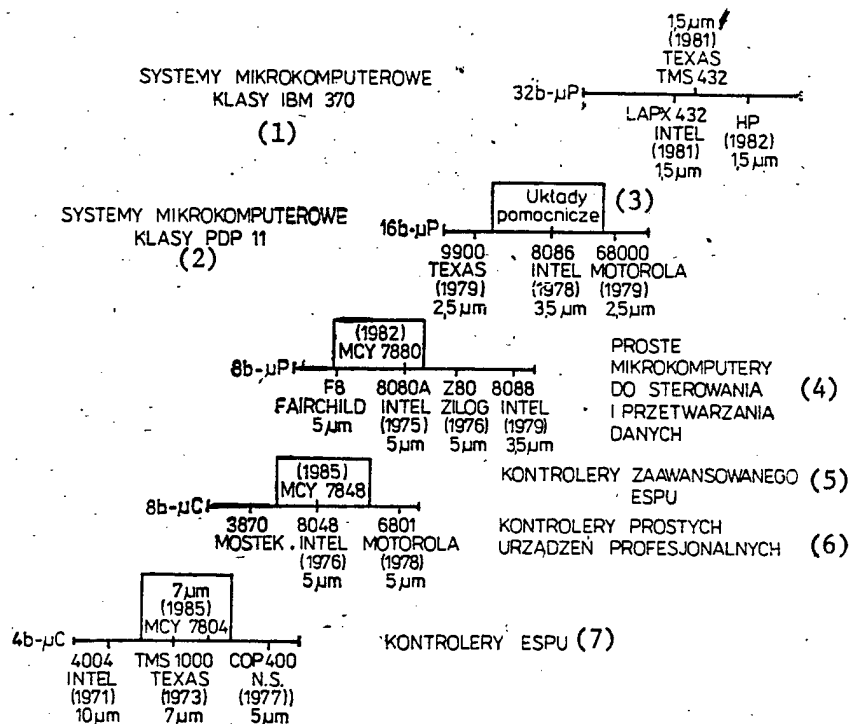


Fig. 3. List of Microcomputers and Microprocessors

Key:

1. Microcomputer systems, IBM 370 class
2. Microcomputer systems, PDP 11 class
3. Auxiliary circuits
4. Simple microcomputers for data processing and control
5. Advanced ESPU controllers
6. Controllers for simple commercial equipment
7. ESPU controllers

Thus, it now is possible to design and produce 8-bit general purpose microcomputers to control and regulate relatively simple technological operations and to process data at low and medium speeds.

During the next 2 years, two families of microcomputers will appear; the 4-bit one will permit the design and production of simple controllers for consumer appliances, automatic washers, kitchen ranges, programmable calculators and radio and TV equipment.

The second family of microcomputers will be employed in more complicated consumer equipment: equipment to control complex musical and TV equipment, computer peripheral devices and complex home appliances.

The auxiliary circuits that are part of the 16-bit microprocessor set will enable the design of microcomputers with an imported central processing unit. Such microprocessors could be used to control complex technological processes. It also could enable the design, for example, of telephone exchanges having a capacity of several thousand or even several tens of thousands of numbers.

Later on in the seminar, a discussion was held in which several dozen speakers participated. A resolutions commission was formed with Eng Ryszard Kujalnik as chairman. The subject of the discussion was the development of a concise plan for the limited development of microelectronics that is in keeping with the realistic capabilities of the components base, the limited funds allocated by the central budget and the limited import possibilities. The plan must include a rational selection of goals and intentions.

It was emphasized that preparing this plan requires the collaboration of electronic engineers with representatives of other ministries of the national economy.

Doc Dr Hab Lech Zacher of the PAN Institute of Philosophy and Sociology emphasized that microelectronics has such an enormous influence on social life that the microelectronics development plan should be based on an honest, comprehensive analysis of the assessment of this technology with the participation of technologists, economists, sociologists and ecologists.

The introduction of microprocessor technology into the structure of the economy is a necessary condition for our industrial products to compete on world markets.

During the discussion, the issue concerning the need for the parallel development of microprocessor technology and the proper development of sensors, controllers, A/D converters and other microprocessor interface devices was also raised.

The introduction of microprocessor technology requires the training of technologists and designers to produce integrated circuits and the training of microprocessor users: programmers, computer operators and system analysts.

During the discussion it was emphasized that the design this year of the 8-bit microprocessor is a very great achievement, but that much difficulty is being encountered in applying it to industrial automation. The past 2 to 3 years were a period of significant reduction in the capability of Poland's electronics industry. The 27 June resolution of the Council of Ministers provides instructions on means to obtain funds to develop microelectronics under the economic reform conditions.

Proposals of the National Seminar on "Microelectronics and Social and Economic Development"

Based on the delivered papers and the subsequent discussions of these papers in the communities represented by the representatives of the scientific institutions, industrial enterprises and the members of scientific-technical associations, it has been ascertained that the need to develop electronics in Poland is indisputable, especially in the present difficult economic situation. The state and development of electronics determine progress in information science, automation, telecommunications, consumer products and in other areas that are important to society. Without the development of electronics, especially microelectronics, it will be impossible to overcome the crisis.

The economic significance of electronics and the electronization that is associated with it will manifest itself above all by:

- a significant increase in social work productivity;
- reduced energy consumption for machines and equipment;
- reduced material consumption for manufactured products and processes;
- improved manufacturing quality and reliability;
- improved quality and reliability for products and services;
- increased competitiveness of exported products;
- elimination of dangerous and toilsome jobs.

Realizing the tasks associated with the electronization of the country will depend to a great extent on developing the electronic components base and the material and technological equipment to manufacture these components.

The seminar participants resolved to present proposals and postulates to the central authorities, the directors of the PAN, the administrators of the Ministry of Metallurgy and Engineering Industry and the Main Administration of the Association of Polish Electrical Engineers.

To the Central Authorities

1. It is essential to recognize that the electronization of the national economy is a strategic necessity for the development of the country's economy. Council of Ministers Resolution No 77 of 27 June concerning this issue should be considered a first step in this direction. It should be a progressive program that is amended at least every 2 years to achieve the maximum effect for the economy. It is necessary to develop stable, systematic solutions for the electronics industry.
2. Special attention to the electronization problem and to the development of the electronics industry, especially microelectronics, should be entrusted to the newly organized Central Office whose task is to stimulate technological progress in the country. It is essential to organize research and development activity via government programs.
3. The technological bases for the electronization of industry must be created, especially the introduction and use of microprocessor technology,

beginning with structural design via technology and ending with exploitation. This is the only way fully to use in the future industry's fixed assets, which represent the national wealth and were achieved at great cost and with much difficulty.

4. The development of the electronization base should have the highest priority in the country.

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DECLINE OF COMPUTER INDUSTRY ASSESSED

Warsaw ZYCIE GOSPODARCZE in Polish No 19, 6 May 84 p 5

[Article by Krzysztof Fronczak: "Information Science--Key to..."]

[Excerpt] Few branches of the economy have been in the center of as many disputes and aroused as many emotions as the computer industry. It was going to be the key to well-being and for quite some time it developed successfully; there were plenty of ideas of how to use it and plenty of money that was to be spent in order to put into practice various fantastic ideas. Finally, the sad conclusion was reached that the hopes did not in the end come true. Today the subject is mostly mentioned in a pessimistic mood, with complaints about past errors and shortcomings. There are few communities as embittered and as divided as computer scientists. The report on the state of the computer industry in Poland published last January by the Secretariat of the Informatics Committee of the Ministry of Higher Education and Science was no less than alarming. There are many indications that this branch of science and technology is experiencing a stagnation in Poland. And this affects an area in which those who do not move forward are actually moving backward.

Last November, the problem was debated by the Sejm Science and Technology Committee. The deputies obtained information on the state of things from Director of the Informatics Committee Secretariat Tomasz Pawlak. Some figures from the report are given below.

Capital spending on computer centers dropped from 5.6 billion zlotys in 1977 to 1.9 billion in 1981, while the relevant proportion of national income spent on this domain declined even faster /from 0.3 percent in 1977 to 0.09 percent in 1981./ This decline is faster than the decline in the overall capital spending: in 1977, 0.82 percent of the total outlays were earmarked for computer science and industry, while in 1981 this proportion fell to 0.39 percent--and it is the equipment that accounts for the bulk of this spending.

In 1982, the average age of a computer working in Poland was 8 years, despite the fact that the depreciation period now in force is only 7 years.

There was a marked decline in the production of computers and especially in the supplies for domestic customers. In 1976, 105 computers were built in Poland and in 1981 only 14, while domestic demand was estimated at 50 units. The production of microcomputers dropped from 360 units in 1976 to 120 in 1981, when demand was estimated at 500 units.

At the end of 1972, computer centers employed some 46,000 people, but some 10,000 moved to other jobs in the recent years, which is not surprising in view of the fact that the average pay is below 10,000 zlotys a month.

Is the economy turning its back on computers? A partial answer to the problem was supplied at the aforementioned Sejm committee debate by Zenon Szoda, head of the Polish Academy of Sciences Institute of Computer Science. "We have primitive equipment and lack the coordination of various undertakings. However, the main problem is that it is not possible to generate demand for computer applications in the Polish economy until the mechanisms of rational and efficient management begin to operate. Any sufficiently developed economy that has no demand for computers is an ailing economy."

Let us now look at the problem from the point of view of one computer manufacturer, the MERAMAT factory of Warsaw.

MERAMAT was a child of the fascination with computers, formed as a result of a merger of two Warsaw factories, one producing measuring equipment, the other a toy manufacturer called PLASTIK. Appropriately, the new firm started to produce toys for grown-ups. From processing plastics it moved to data processing equipment.

The new company was soon incorporated in the MERA electronic industry group, which is reflected in the name to this day. The group, incidentally, was quite diverse. Its factories produced industrial automation equipment, pressure gauges, clocks and computers. Today, in perspective, the MERA group's merits in the development of Polish computer industry are appraised rather coolly. At the Sejm committee debate, the bad shape of the computer industry at present was attributed to nothing less than the "destructive activity of the former MERA" and its computer production was branded as "cottage-industry" occupation.

Managing Director of MERAMAT Stanislaw Gorczynski, former head of PLASTIK, reminisces: "Plenty of money was spent on this industry. It looked as though we were going to conquer the world and produce everything the domestic and world computer markets might need. But we did not make the world happy with the help of Polish computer equipment. Over 3 years I sold several million dollars worth of magnetic heads, that's all. Nothing else could be exported to the West. That was the clash with reality."

The license purchase policy must have been devised blindly. One purchase concerned disc memories which were outdated right from the start and had no chance of being exported. Before the licenses were purchased, some big institutions purchased computers abroad for borrowed dollars. Over 30 systems were imported in this manner. By now it is very aged equipment. There were also some units that were assembled in Poland from original imported components.

The development of the Polish computer industry was to be based on domestic demand for its products. MERAMAT was supposed to make tape memories for ODRA computers at a rate of 3,000 units a year. In order to use so many memories, the Wroclaw ELWRO plant would have to build at least 500 ODRA computers per year. In actual fact, production never exceeded 800 memories a year, at which level problems with sales already appeared. In the end, only 150 memories were produced in one year. "Those futuristic programs were a real curse for the computer industry. The lack of marketing research cost us a lot of money that went literally down the drain."

In 1975, a license for a system designated today MERA 9150 was purchased for MERAMAT in Britain. Since then, MERAMAT has produced 600 such systems for Polish users and exported 100 units to Yugoslavia and Hungary. According to company managers, it is a very good system and one of the few imported licenses that have stood the test of time. In brief, it is a system of equipment for the preparation and initial processing of data on a magnetic tape, a typical example of the class of data preparation systems. MERA 9150's are used by the Central Statistical Office, the National Bank of Poland; the mining industry uses them for preparing payrolls and employment registers and they are also used for the "Magister" system of data on university graduates. The Hungarians and Yugoslavs have been praising them too.

The reform is forcing enterprises to increase efficiency. This requires reliable and immediately available information. Formerly, computers were purchased as a matter of ambition so that a managing director could have something to boast about in front of other directors. Today for those who value their time and money, the computer is simply a business tool. [...]

Says Jan Szumigaj, MERAMAT director for technical affairs: "The bigger institutions were the first to grasp the advantages of computerization and they prosper by using its fruits. They are actually acquiring additional systems. Those which were left with the outdated punched card technology and those which only installed computers as status symbols, advertised them for sale as soon as the reform took effect."

According to MERAMAT managers, the MERA 9150 should be able to satisfy the needs of Polish customers for the next few years, although not enough of them will be available. A huge RYAD computer costs between 40 and 50 million zlotys, and an ODRA sells for 16-18 million zlotys. The 9150, on the other hand, costs about 5 million zlotys. Assuming that the 9150 can perform 90 percent of the operations for which ODRA computers were employed so far, and taking into consideration the fact that the mini is easier to use and maintain and does not require air-conditioned premises, it is easy to understand why the customers show a strong preference for this kind of a machine. But there is another paradox here: the demand exceeds supply, but on the other hand Deputy Waldemar Michna said at the November Sejm committee meeting that "the degree of utilization of computer equipment amounts on the average to not more than 50 percent of its potential. Computers work for 10 hours a day on the average while minicomputers are only busy for 4.8 hours a day." One of the MERAMAT bosses' arguments

about the advantages of minicomputers over mainframe machines was that the former could take over many of the duties of the bigger ones. Deputy Michna's figures suggest that there is not enough workload for both the mainframe machines and minicomputers, or, to be precise, those who have them are not able to use them.

Since 1980, when 84 MERA 9150 computers were produced, MERAMAT's output kept declining. In subsequent years, it amounted to 69, 65 and 54 units, while the plan for 1984 speaks of 90 such sets, out of which 70 will be sold in Poland and 20 will be exported. The factory will also export memory systems to Czechoslovakia, cassette memories to the Soviet Union, East Germany, Romania and Hungary and magnetic heads for digital recording to the Soviet Union and West Germany. The overall value of production will reach 1.4 billion zlotys, with exports accounting for 75 percent of the figure. Were it not for exports, the factory would soon face bankruptcy, being unable to sell a major part of its output at home, according to Director Gorczynski. The production of minicomputers is limited by the supplies of components while the remaining MERAMAT products are not in great demand at home. This suggests that it would not be so easy to earn a living by producing computer equipment exclusively for the home market.

Like any other manufacturer, MERAMAT complains about ancilliary suppliers. Every day the managing director collects on his desk a thick pile of letters and telexes from component suppliers informing him that they cannot supply the ordered parts because of the lack of materials.

ELTRA of Bydgoszoz, the only maker of connectors in Poland, apparently beset by supply shortages, notified MERAMAT that it is changing the thickness of the gold coating, calling it "economy thickness." But what may appear to be an economy solution to ELTRA is unacceptable for MERAMAT as there can be no second-grade quality in computer trade similarly as there can be no "economy" version of a computer.

The suppliers also ask for hard currency. Although it would not be proper to laugh, the demand advanced by the PAMOTEX textile factory of Pabianice is really funny: they ask for 10 cents for every meter of reprocessed cotton flannel fabric. Without 4,000-5,000 meters of that reprocessed flannel, MERAMAT will not clean the magnetic heads, so it can hardly turn down the request.

Despite all the problems with the ancilliary suppliers, Director Gorczynski says that there are in general no problems with the end product of his factory. The fact that the factory may retain a part of the hard currency revenue from its sales to the West helps to survive. MERAMAT also cooperates with the COMPUTEX, DAMPOL and AMEPOL Polonian companies, which supply some parts incorporating imported components. Thanks to these contacts, instead of 4,000 dollar magnetic core memories, which are falling into oblivion all over the world, MERAMAT can now use memories based on semiconductors, which have a much bigger storage capacity. The number of elements the factory needs was often too small for the METRONEX foreign trade company to

bother about attending the transaction promptly. The Polonian firms do the job with much more zest and, according to Gorczynski, it is possible to do some bargaining too.

For all the stagnation in the industry, MERAMAT appears to prosper. However, the designers do not imagine the future of the industry without at least some import of components. Domestic component suppliers have been attempting to keep production going despite the permanent dearth of suitable materials. The products do not conform to quality requirements, so their makers readily lower the price and ask the customer to accept their terms. However, computer equipment is one area in which it is really impossible to economize on performance. A fault in a computer may even have social repercussions. Just imagine a breakdown of a computer preparing the payroll for miners or of a bank computer.

MERAMAT maintains traditionally good relations with its license supplier, the British Rediffusion Computer Ltd. Under an agreement with that firm, the design of the 9150 is to be further developed. Both companies are to install the machines jointly for Polish customers. MERAMAT is also going to keep a spares store for the licensed and British machines.

No doubt, the Polish computer industry is going through a hard time, which is a consequence of its chaotic development in the past. It looks as though the economic reform clarified the situation in a way by exposing the shortcomings in the structures which took over a dozen years to build. From a manufacturer's point of view, it is hard to overlook disquieting phenomena, such as the stagnation in electronics and loss of specialists, both among users and designers.

CSO: 2602/35

RESEARCH ON CROP PROTECTION, PESTICIDES

Bucharest PRODUCTIA VEGETALA in Romanian May 84 pp 42-43

[Article by Al Alexandri: "Achievements and Perspectives in Research on Plant Protection and Contributions to the Reduction of Losses Caused by Disease and Parasites"]

[Text] The annual scientific session of the Institute for Research in Plant Protection took place on 7-8 February, 1984. It provided the 150 participants from research, academia and production direct acquaintance with the Institute's latest scientific results and led to the suggestions of new directions and means for tackling some problems of major agricultural interest.

Three general topics were discussed at the session:

1. Research on the etiology and control of some plant culture diseases.

The reports presented dealt with a series of problems of great phytopathologic interest, notable, in particular, for their intricate approach to them. For example, in the case of the premature death of peach trees, it was sought to establish the role and significance of various pathogens (microplasms, bacteria, fungi), opening up ways to elucidate the phenomenon. Also of interest were the results concerning the creation of strains of tomatoes, peppers, and tobacco resistant to VMT, thermotherapy of viral viticulture diseases, the role of microplasms and viruses in the yellowing syndrome of barley, the chemical control of bacterial disease of cotton, the Fusarium populations in fodder implicated in animal pathology, etc. Research on the cultivation of the antagonistic fungi Trichoderma Viride in a liquid medium constitutes a step forward on the path to obtaining biopreparations for biological control of some plant culture diseases.

We also note the recording of two new diseases that have appeared in our country: bacteriosis of the castor oil plant and eutiposis of apricot trees.

2. Research on agricultural plant parasites and their control.

The reports presented stressed, in particular, means for tracking and estimating populations of parasitic insects and some elements which intervene in the populational equilibrium, and which can or are on the way to being

utilized in an integrated control system. Notable, too, is the progress made in obtaining biopreparations based on entomopathogenic fungi which could prove useful in agricultural practice.

Also mentioned were the results obtained in controlling populations of rodents parasitic to orchards and the recording of a new aphid for Romania, on species of seeds.

3. The efficacy of pesticides in the protection of agriculture.

The papers presented make clear the complex manner in which the problem of using pesticides was approached. Apart from biological efficacy, they dealt with a whole series of major aspects connected with the possibility of association of many more active substances, the influence of certain factors on the level of biological action, the correlation between the foliage surface requiring protection and the volume of the suspension applied, the possibility of reducing the volume of treatment applications, resistance developed to pesticides, the effect of pesticides on antagonistic relations, etc.

Chemical researches dealt with problems of pesticide residues on grape vines, sunflowers and in the soil, aspects of their influence on the metabolism of plant cultures, analytic methods, etc.

Noteworthy are the results obtained in the creation of mechanisms for the cleanup of herbicide residues from the soil and for the decontamination of relatively extensive areas of organochlorate insecticide residues.

All in all, the session produced intensive exchange of opinion and information among specialists in the area of plant protection, destined to contribute to the growth of agricultural output.

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END